

Evaluation of *Waltheria indica* L. and
W. americana L. (Sterculiaceae)
Pacific Plant Studies 28

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Waltheria indica L., Sp. Pl. 673, 1753.

W. americana L., Sp. Pl. 673, 1753.

W. americana L., var. *indica* (L.) K. Schum.
in Engler, Monogr. Afr. Pflanzenf. und
Gattung 5: 47, t. III, f. J, 1900.

W. indica L., var. *americana* (L.) R. Br. ex
Hosaka, Bishop Mus., Occ. Papers 13: 224,
1937.

W. pyrolaefolia Gray, Bot. U. S. Expl. Exped.
190, 1854.

Waltheria americana L. In the Linnean Herbarium,
London, this is filed as genus 852, species 1. In
that species, sheet 1, from Bahama, has the calyx
4.1 mm long, 1.5 mm wide, hirsute, the lobes 1.5
mm long, broadly subulate, with hairs 0.3-0.5 mm
long, and a typical leaf is 26 mm long, 15 mm
wide, elliptic, crenulate. Sheet 2, from Surinam,
labeled *americana* ? by J. E. Smith, has similar
calyces, but a typical leaf is 50 mm long, 25 mm
wide, ovate, subacute, crenulate.

W. indica L. In the Linnean Herbarium this is
represented by genus 852, sheet 3, from India. The
calyx is 4 mm long, 2 mm wide, hirsute, the lobes
2 mm long, narrowly deltoid, their hairs 1 mm long,
and the leaves 22-48 mm long, 12-29 mm wide,
elliptic ovate, serrate. Sheet 4, without locality,
named *W. angustifolia* L., of the Syst. Nat., ed.
10, 1,140, 1759. Someone had crossed out the
angustifolia, and redetermined it as *indica* L. On
this sheet no good calyces are visible, but the
leaves are about 27 mm long, 10 mm wide, lanceo-
late, serrate.

No clear differences were observed between
these three Linnean species of *Waltheria*.

A certain and final classification of this
group of pantropic weeds is not easy to achieve.
The writer has struggled with it for more than
two decades.

He has studied the types of both of the Linnean species, and has spent much time studying the large collections of this plant in several important European and American herbaria. Depending upon the moisture or the aridity of the habitat, and whether on the main stem or on lateral branchlets or suckers, the leaves are quite variable. They differ in size, shape, and pubescence. Upon such leaf characters a large number of segregate species and varieties have been published. What seemed at first to be the more significant differences were found in the size of the calyx and the size and shape of its lobes. After a lengthy investigation it was decided that the calyx character, too, was one with fluctuations and was not significant; and the leaf fluctuations were earlier abandoned.

Clearly the result of much study, were the observations of Robert Wight and G. A. Walker-Arnott (1834: 67): "A very common and variable plant; so that in addition to the above synonyms, we feel certain that W. angustifolia [and six others] are mere forms of the same species, arising from local circumstances. When the plant is broken or injured by cattle, it sometimes pushes out numerous small leaves branches, consisting then W. microphylla, Cav. Some specimens are procumbent, others erect; some arborescent, others suffruticose. In some the leaves are orbicular, in others ovate, and they are usually tomentose, but sometimes nearly glabrous; . . ."

Two slightly different specimens of this were collected by D. Nelson in 1779 at or above Kalakekua, Hawaii. The species has always been considered an exotic weed in the Hawaiian Islands, but now it would seem to be one that was accidentally introduced through its bur-like fruits by the Polynesians on some of their voyages from Tahiti and the other Society Islands.

Merrill (1954: 245) in his study of the early records of adventives in the Pacific, states that Waltheria indica (W. americana) was not collected in Tahiti by Banks and Solander on Capt. Cook's first voyage in 1769, but that on the second voyage, in 1773 the Forsters did collect it. He states,

"It is suspected that actual introduction was via the Endeavour (Cook's first voyage) in 1769, but this cannot be proved, or when Bougainville visited it in 1768."

To have been an established part of the Hawaiian flora in 1779, when Nelson collected his two specimens, the Waltheria must have been introduced earlier and had time to propagate and spread. From that it must be deduced that it came in as a weed with the propagules of taro, sweet potato, or other crops brought from Tahiti or other Society Islands by the Polynesians on their voyages in the early centuries A. D. It could have reached Tahiti by human carriage via Oceania from Asia. This implies the theory that it was established in Tahiti long before the European voyages, and that Banks and Solander merely did not collect it when on Cook's first voyage.

Fosberg and Sachet (1975: 19) discuss the classification of W. indica L. and W. americana L. "Hawaiian material agrees with that from America in being densely velutinous rather than thinly so, as is that from the western Pacific and southern Asia. We are accepting the view that one pantropical species involved. The rather conspicuous difference in density of indument may be recognized by maintaining var. americana for the predominantly American densely hairy form and var. indica for the more thinly pubescent Old World plant. Over its wide geographic range Waltheria indica produces many local forms distinguishable by other characters, but these have usually not been afforded taxonomic recognition."

Fosberg and Sachet do not say that they have studied the Linnean types of W. indica and W. americana. The writer has studied them, and made careful drawings of their calyces and leaves. With these in hand, he has studied the masses of material in several principal herbaria of Europe and America. Contrary to the statement by Fosberg and Sachet that the local forms have usually not been afforded taxonomic recognition, numerous species and varieties have been described from this population. For instance, A. Robyns (1964: 74) lists fifteen synonyms under W. indica,

and K. Schumann (1886) 53-68) describes two varieties on leaf shapes, and many other such could be cited.

After this study of the variability of W. indica, the status of W. pyrolaefolia Gray has been reexamined. It was collected by the botanists of the U. S. Exploring Expedition, in 1840 on the sand hills near Wailuku, Maui, and has since been considered a local endemic. The holotype at the Smithsonian Institution, Washington, and isotypes at the Harvard Herbarium, Cambridge, and at Paris, have been studied. Its leaves are suborbicular to broadly elliptic, and subglabrate above; the calyx is 5 mm long, campanulate, with the lobes $2/5$ as long, narrowly deltoid. No one has found it again at the type locality or elsewhere. After comparison with abundant specimens of the introduced weed, in lack of any significant differences, W. pyrolaefolia Gray is here reduced to the synonymy of W. indica L.

Charles Gaudichaud of the Uranie Voyage collected in the Hawaiian Islands in 1819. He collected Waltheria indica, his no. 140, gave the vernacular name "ey oloa," and commented, "fut commun dans toute les iles Sandwich près des établissements." This quotation is from his collection number book, now in the Museum National d'Histoire Naturelle, Paris. His observations confirm its nature as an introduced weed in the Hawaiian Islands.

Literature Cited

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